WASHINGTON
SCIENCE TRENDS

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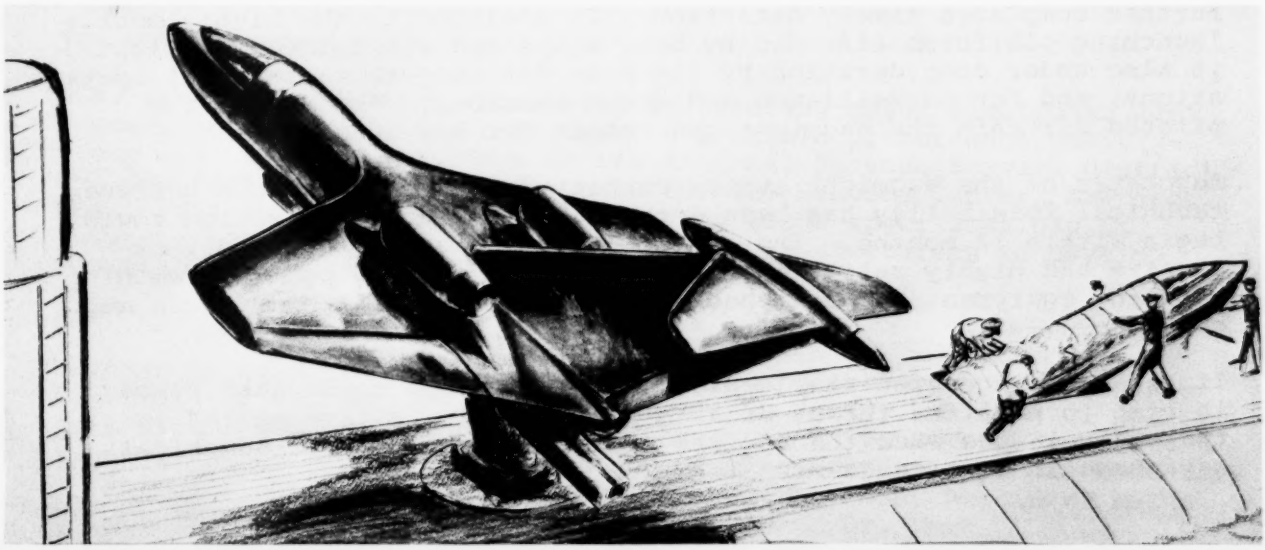
Project Wagmight

Profound effects on military planning and strategy are seen by some Pentagon officials as a result of Project Wagmight, an inflatable, long-range weapon system. Here is the first report on this provocative project:

Missile-Aircraft: According to present design concepts, Wagmight is an inflatable-type missile-aircraft capable of performing low-altitude long-range tactical and strategic missions at high subsonic speeds, approximately 500 miles per hour.

Design plans include a 20-foot wing span, an overall length of 39 feet and a height of 9 feet in a high-wing monoplane configuration. Propulsion is supplied by two standard jet engines mounted on the upper side of the wing. Dry empty weight is estimated at 3800 pounds. Wing, fuselage and cockpit would be constructed of neoprene-coated nylon cloth. Powerplants and landing gear would be the only rigid components of conventional meterials.

Operation: Wagmight may be piloted, or may operate as a missile, drone or decoy with a self-contained guidance system, according to mission requirements. Takeoff is said to be possible from land, sea or aircraft carriers. With a short and relatively simple catapult or rocket-assisted launcher, any ship or submarine, or even some large-size army trucks, could serve as a launching platform. Artist's concept of submarine-launching of Wagmight:



Project Wagmight (Continued)

Packaging: Inflatable characteristics are said to make possible a number of applications for which existing aircraft or missiles might not be suitable. The inflatable Wagmight could be packaged in a number of different ways, it is reported. In one system the complete, deflated Wagmight is placed in a cylindrical container 50 inches in diameter and 23 feet long. Inflation and flight preparation would take about 30 minutes. For other purposes, the system would be placed in three packages, consisting of the fuselage, wing-tail and propulsion units, with an assembly time of 45 minutes. Where smaller packages are desired, because of storage space limitations, the Wagmight could be disassembled into six small cylinders, with an assembly time of about one hour.

Structure is maintained in flight by compressed air taken from the compressor of the jet engine. It is estimated that flight pressures can be maintained satisfactorily despite several hundred punctures.

Other Features: According to studies of the Wagmight system, the fabric material can resist abrasion and relatively rough handling. A type of "tire patch" could repair abrasion and rips and normal aircraft-missile support facilities such as welding, sheet-metal and riveting would not be required. When packaged, damage is said to be virtually impossible. No problem of sea corrosion is expected.

Application: Novelty of the Wagmight system may lie principally in its tactical and strategic applications. When equipped with presently available guidance, Wagmight could be deployed in numbers from virtually any ship in the Navy, including submarines when surfaced. Payload capability, in terms of warhead, are reported to match or surpass conventional ICBM's.

Operational range at 500 feet is expected to be in the vicinity of 1,500 miles, bringing any significant military target within range of Navy vessels. Low altitude penetration at high speeds is said to reduce the possibility of interception or destruction to a minimum. The inflatable structure does not reflect radar and low altitude further completes timely detection. In addition to the highly mobile launching platforms afforded by Navy ships and submarines, Wagmight is also under consideration by the Army for long-range tactical operations, and for surveillance and drone missions. When used as a piloted aircraft the Wagmight can return for sea landings.

Advocates of the Wagmight system connected with the Pentagon believe technical feasibility has been established and that production could begin within 12 months. The system has been described as an inexpensive and highly reliable deterrent which could be produced with existing equipment and equipped with "off-the-shelf" powerplants and guidance.

It has been suggested that deployment of Wagmight could take place in time to meet the threat of a "missile gap" -- a time period in the early 1960's when the Soviets are expected to have a numerical advantage in long-range missiles.

R&D NEWS-NOTES

Project Vega

Cancellation of the Convair - Vega rocket booster program, for which approximately $48 million in appropriated funds is still to be spent, will not mean a decrease in spending by the National Aeronautics and Space Administration for this type of vehicle. NASA officials were impressed by the high reliability of the Lockheed-Agena upper stage as used in the Air Force Discoverer program and decided to adapt it to its own purposes such as large earth satellites, space probes and lunar landing of instruments.

NASA decided not to use the General Electric Co. 34,000-pound thrust liquid-fueled second stage engines but will continue to support work at the Jet Propulsion Laboratory on the 6,000 pound third stage originally planned for Vega. This engine uses nitrogen tetroxide and hydrazine fuels which can be stored on long missions without evaporation problems.

Vega's replacement will be the Atlas-Agena, expected to be ready late in 1960 - or about the same time as Vega as originally planned.

NASA Leadership

Major Gen. Don R. Ostrander of the Air Force now assumes control of Launch Vehicle Programs of the NASA taking over much of the work of the agency's Space Flight Development Division, headed by Dr. Abe Silverstein. However, one of Gen. Ostrander's chief tasks will be to supervise the course of the "shotgun wedding" between NASA and the Von Braun space booster team at Huntsville, Ala. It remains to be seen whether the traditional Air Force-Army disinclination to work together on space projects can be overcome.

National Academy of Sciences

Dr. Augustus B. Kinzel, Vice President for Research of Union Carbide Corp. is the new chairman of the Division of Engineering and Industrial Research, National Academy of Sciences.

Tax Data Processing

U.S. Internal Revenue Service will be briefing major electronic data processing manufacturers this week on possible procurement plans. Group will meet for two days at the Internal Revenue Service District Office, Boston, and then will go to the IRS Service Center, Lawrence, Mass. The Service expects to be able to issue specifications in "several weeks" which will be used by the manufacturers to develop computer system proposals.

ARPA Leadership

Defense Department continues to downgrade the authority and responsibilities of the Advanced Research Projects Agency, which will now report directly to Dr. Herbert York, who controls Pentagon research and engineering policies. ARPA formerly reported directly to the Secretary of Defense. ARPA will now be directed by Brig. Gen. Austin W. Betts who is expected to play a "caretaker" role for Dr. York.

Research Checklist

( ) Aircraft Engine Evaluation: A new technique for evaluating the condition of aircraft engines is credited by the Navy with the prevention of serious in-flight engine failures. A one-ounce sample from the engine oil reservoir is burned between two carbon electrodes in a direct-reading spectrometer which identifies the metals and indicates quality. Navy says that a high concentration of silver indicates a faulty bearing, a large amount of chromium denotes cylinder wall damage, while large amounts of aluminum can indicate piston or valve guide failures. It is believed that similar methods can be applied to gas turbines.

(R&D by Engineer Materials Laboratory, Bureau of Naval Weapons, Naval Air Station, Pensacola, Florida)

( ) Radio Propagation Studies: Boulder (Colo.) Laboratories of the National Bureau of Standards are expected to sponsor studies of low-frequency radio waves in Antarctic regions, and the electrical properties of snow and ice. It is hoped that the data gained can be used to develop a "critically needed" electronic crevasse detector, and will also be of value in long-range navigation and aircraft radar altimeter systems.

( ) Detonation Wave Studies: New chemical methods and possible new supersonic propulsion systems may result from research sponsored by the Air Force Office of Scientific Research. In the studies, stable, standing, normal and oblique detonations have been produced in a laboratory. Experiments were carried out in a supersonic research tunnel, using hydrogen and air at high temperatures and pressures as a detonant. Currently under study is a possible detonation-wave ramjet, with such theoretical advantages as short length, light weight and relatively good specific fuel consumption at hypersonic speeds. In chemical plants, it is suggested, controlled detonations at low pressures might permit the extraction of intermediary chemical species.

(R&D reported to American Institute of Chemical Engineers by R.A. Gross, Department of Physics, University of California, Berkeley)

( ) Airborne Equipment Standards: Federal Aviation Agency proposes to require that airborne equipment installed by airlines voluntarily, in excess of requirements, be certified. Devices include airborne weather radar, Doppler radar, distance measuring equipment, transponders, and other equipment.

(Written data, views or comments on the proposed regulation may be sent in duplicate to Docket Section, FAA, Washington 25, D.C. by Feb. 5, 1960)

( ) Gallium Phosphide: Army Signal Corps reports construction of an electronic diode using the rare metal gallium phosphide for experimental operation at temperatures up to 1500° Fahrenheit. The material is said to have withstood heat seven times higher than silicon and germanium, previously used. The material was "home-grown" at the U.S. Army Signal Research and Development Laboratory, Ft. Monmouth, N.J., where it is undergoing further evaluation prior to release to Army equipment development engineers.

( ) Field Test Set Calibrator: Navy has developed a portable, high accuracy standardizing unit to calibrate mine and special weapons test sets. The device, weighing 400 pounds in three self-contained cases, is designed to withstand severe environmental conditions while maintaining an overall accuracy of 0.1 percent d.c. and 1 percent a.c. Principal parts include an analyzer, timer, power supply, multimeter and transfer standards.

(R&D by Magnetic and Electrical Division, Underwater Electrical Engineering Department, U.S. Naval Ordnance Laboratory, White Oak, Md.)

( ) Chemical Cotton Modification: Agriculture Department studies indicate that desirable modifications of cotton may be obtained through the use of gamma radiation to polymerize unsaturated monomers. Test fibers prepared under the new approach showed a small decrease in breaking strength, a "significant" increase in elongation at break, and a decrease in stiffness.

(R&D by U.S. Department of Agriculture, Agricultural Research Service, Southern Utilization Research and Development Division, New Orleans, La.)

( ) Airframe Insulation: Research at the National Bureau of Standards has resulted in a new type of ceramic coating for possible use as thermal insulation on airframes. In this process ceramic oxide powders are bonded with monoaluminum phosphate. It was found that the coatings do not require a high firing temperature and that curing at 400° Fahrenheit imparts stability to the structure and provides satisfactory water resistance. A good bond to clean sandblasted metal surfaces was obtained. The greatest promise for the new coatings is said to lie in their potential use as thinly applied layers.

(Report available. Single copies free. Write National Aeronautics and Space Administration, CODE BID, 1520 H Street, N.W., Washington 25, D.C. for Technical Note D-106)

Publication Checlist

( ) Crude Oil Analysis: a reference guide to more than 3,000 analyses of crude-oil samples in the United States and Foreign Countries dating back as far as 1921. A special finding index in the bibliography permits rapid location of reference sources for specific fields. $1. (Write Superintendent of Documents, Government Printing Office, Washington 25, D.C. for Bureau of Mines Inf. Circ. No. 7921)

( ) Gas Lubricated Bearings, an extensive survey by Columbia University on many types of gas-lubricated bearings, with a number of equations useful in analysis and design. 300 pages. $4. (Write OTS, U.S. Department of Commerce, Washington 25, D.C. for PB 151 946)

( ) Electroluminescence, a 1959 selected bibliography covering various articles on this subject in journals and Government-sponsored research reports. 12 pages. 50 cents. (Write OTS, U.S. Department of Commerce, Washington 25, D.C. for PB 151 993)

( ) Army Research and Development, an illustrated series of lectures by Lt. Gen. Arthur G. Trudeau, Chief of Research and Development, Department of the Army. 67 pages. Single copies free. (Write The Adjutant General, Department of the Army, Washington 25, D.C., for DA Pamphlet 70-15)

( ) Defense and Space Materials, new priority regulations for materials affecting prime and subcontractors of the Department of Defense, National Aeronautics and Space Administration, Atomic Energy Commission. Guaranteed to confuse anyone. 17 pages. Single copies free. (Defense Materials System, Regulation I, as amended, available free at U.S. Department of Commerce Field Offices or write Business and Defense Services Administration, Department of Commerce, Washington 25, D.C.)

( ) Copper Ore Treatment, a new report on segregation process treatment for oxidized and mixed oxide-sulfur copper ores. Also presents data from batch and continuous segregation tests of copper ores of different types and grades. 28 pages. Single copies free. (Write Publication-Distribution Section, U.S. Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa. for Report of Investigation 5501)

( ) Science Manpower, a new presentation of facts and figures on employment, salaries, occupations of scientists during 1954-55. Median annual salary during the period was $6,525. 49 pages. Single copies free. (Write National Science Foundation, Office of Information, Washington 25, D.C. for Publication NSF 59-39)

( ) Employment of Retired Military and Civilian Personnel, a transcript now released, of testimony and statements relating to "entertainment" of Pentagon officials. 203 pages. Single copies free. (Write Subcommittee for Special Investigations, Committee on Armed Services, House of Representatives, Washington 25, D.C. for Supplemental Hearing - Sept. 10, 1959)